CHAPTER 2

industrial

Faridah Qamaruz Zaman

This chapter challenges the notion of a typical factory. Hidden in the microscopic world, these tiny organisms are manufacturers par excellence of perfumes, medicines, enzymes, and biopolymers. So the next time one injects insulin, or wear an oudh perfume, one should give thanks to these unsung little heroes.

Coincidentally, a scientific journal called Microbial Cell Factories, an open access journal with an impact factor of 4.25 exists. This indicates the importance of these microbeings in our daily lives. The genetic material from the opium poppy (Papaver somniferum) has been inserted into the baker's yeast to manufacture morphine by researchers from Stanford University. Does this mean there is no need to plant poppies now? For the time being, planting poppies is still required. As with any new scientific discovery, the transition from lab scale to industrial scale can take a long time. The humble yeast which has been utilized by mankind for 4000 years continues to be relevant in the modern society.

Gaharu has many names: gaharu/ karas (Malay), agar (Urdu, Hindi), chenxiang (Chinese), tram huong (Vietnamese), Mai Kritsana (Thai), oud (Arabic), jinko (Japanese), aloeswood (European). It is the interplay between two organisms that produces an amazing and highly prized resin. Again, one is awestruck by the service provided to mankind by the creatures invisible to the naked eye. The global market value of gaharu is USD6-8 billion and is expected to grow further. Hence, there is a strong interest in planting gaharu in Malaysia these days.

Another example of the dependence of man on microbes is their role in wastewater treatment and biodegradation. Both aerobic and anaerobic bacteria break down our sewage and at the same time produce byproducts such as methane and carbon dioxide. Biodegradation by bacteria is an important tool in management of oil spills and natural gas leaks.

Even plants which contain chloroplasts that help them to carry out photosynthesis, may have relied on symbiotic cyanobacteria to kick start the vital process. The striking similarity of the thylakoid membranes to the folded layers within the cyanobacteria is unmistakable. The cyanobacterium Synechocystis sp. PCC6803 was the first photosynthetic organism whose genome was completely sequenced, thus it serves as an important model organism to green plants and algae.

This chapter serves to remind us that size in this case does not matter.

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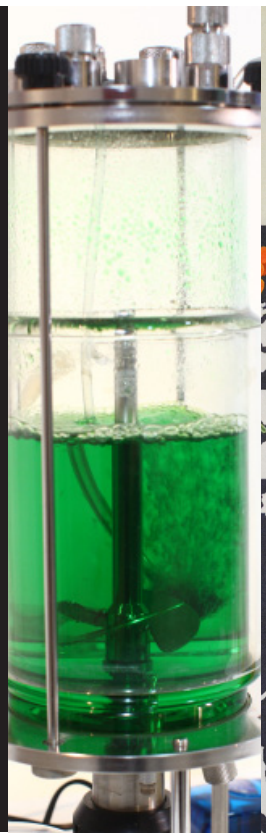

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